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ZOE

A BIOLOGICAL JOURNAL.

VOL. I. JULY, 1890. No. 5.

FLORA OF THE CALIFORNIAN ISLANDS.

BY T. S. BRANDEGEE.

The flora of these islands is of much interest to botanists on account of the variations from mainland forms, largely due of course to isolation and the effect of insular climate. There are some plants upon them that in the present state of our knowledge appear to be endemic, but their number has been much exaggerated and will doubtless be continually lessened by the collection of fuller material and by future exploration of the southern mainland, much of which is still almost unknown.

A difference in the specific names of plants does not necessarily mean a great difference between the plants themselves. It may mean great variation in structure and it may mean almost or quite none at all.

It has been suggested that these islands are the remnants of a western "Atlantis." The botanical arguments in favor of the theory are drawn principally from the flora of Santa Cruz Island and consist mainly of: numerous new species; absence of *Platanus*, *Spiræa*, *Fragaria*, *Potentilla*, *Geum*; the rarity of *Delphinium*, *Ranunculus*, *Ribes*, *Trifolium*, *Rubus*, *Lonicera*, etc.

The absence of the sycamore is easily accounted for—it loves the rich alluvial lands bordering slow flowing streams, and the cañons of the islands sloping steeply to the sea offer no such habitat. *Spiræa*, *Fragaria*, *Potentilla* and *Geum* are plants of cooler regions, comparatively rare on the adjacent mainland and to the south—the last, indeed, one would hardly expect to see mentioned in connection with the islands. *Ranunculus*, *Delphinium* and *Trifolium* are about as abundant, in the proper season, as at any place on the southern mainland. *Ribes* fruiting freely and *Lonicera* are fairly abundant and *Rubus* on the south side is plentiful and luxuriant, often completely covering small oaks.

The islands have a long coast line in proportion to their area and in consequence their flora is a coast one or "Pacific American." Those not found on the islands are mainly those lacking on the mainland near the coast. The plants from the south growing upon the islands should be regarded as stragglers from those regions in a climate more even* than that of the adjacent mainland, rather than as spreading from them to the south. Many of the species of widest distribution and embracing the greatest number of individuals are southern, and their predominance gives to vegetation an appearance very different from that of the nearest mainland.

The appended table has been drawn from Lyon's list† of the plants of Santa Cruz and San Clemente, from E. L. Greene's list of Santa Cruz‡ and San Miguel§ and those of the writer of Santa Cruz‖, Santa Rosa‖ and Santa Catalina¶, together with a few names derived from other sources.

So far as time has admitted, the original specimens have been examined, and the changes made, in all cases unless otherwise stated, have been based on these re-examinations. Many errors due in most cases probably to haste or imperfect material have been thus detected, and the writer will be pleased to receive notes of any others which may be discovered in the future.

The list contains about 512 species and the number will, of course, be somewhat increased by future collections. Twenty-six species of the list have not yet been found upon the mainland, though all but three of this small number are near relatives of coast forms and twelve of these twenty-six plants have also been found on the islands lying off the coast of Lower California, leaving but fourteen species belonging solely to this group. Not a single species is found on San Miguel which does not belong to other islands and only four, some of them doubtful, on Santa Cruz. The present relation of the island to the mainland floras is thus seen to be very widely different from the one formerly set forth, in which twenty-eight species were claimed as peculiar to Santa Cruz alone and forty-eight as peculiar to the group, the percentage of endemic species for Santa Cruz being reduced to less than one and that of the group to less than three, with every probability that it will be decreased each succeeding year.

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*Zoe i, 109.
† Bot. Gaz. xi, 107 and 330.
‡ Bull. Cal. Acad. ii, 377.
§ Pittonia i, 74.
‖ Proc. Cal. Acad. ser. 2, i, 201.
¶ Zoe i, 107.

The small islands with their few species of plants have not been given a column in the list, nothing different having been found on them. No attempt has been made to separate the introduced from the indigenous plants and all have been noted as "common" when widespread, or extending nearly the same distance north or south of the islands, "southern" when the center of distribution is south and "northern" when north (seldom) of the insular habitat.

To Dr. Sereno Watson, Mr. W. S. Lyon, Rev. J. C. Nevin and Mr. H. C. Ford, the writer is under many obligations for specimens and notes concerning them.

Species.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
Clematis ligusticifolia Nutt		*	*	*		Common.
Clematis pauciflora Nutt			*			Southern.
*Ranunculus Californicus** Benth	*	*	*			Common.
Ranunculus hebecarpus H. & A				*		Common.
Delphinium Parryi† Gray		*	*	*	*	Adjacent mainl'd.
Berberis pinnata Lag			*			Common.
Crossosoma Californicum‡ Nutt				*		Southern.

*Mr. Greene in Bull. Cal. Acad. ii, 389, and Bull. Torr. Club, xiv, 118, takes up the name of *R. Deppei* Nutt. for this species. It is mentioned in Torr. & Gray Fl. under var. β of *R. acris* apparently as an explanation of a MS. name for specimens. It is there mentioned only to disclaim it, and if Mr. Greene is correct in attributing to Nuttall and not to Torrey & Gray the real authorship (Pitt. i, 240) of the notes and descriptions of his western plants, the disclaimer is by Nuttall himself. If a manuscript name cannot even be mentioned, without involving questions of priority, a new and most annoying element will be added to the already sufficiently great confusion. Another statement made in connection with the above shows the need of care in bibliographical details. Mr. Greene claims that *R. Deppei* antedates *R. Californicus* by "not much less than twenty years" and gives the date of the latter as "Benth. Pl. Hartw. 295, A. D. 1857." It is difficult to understand how he can have overlooked on the title page of that work, the figures "1839—1857," or failed to see that the signature in which the description occurs, as well as the following one, is dated "Dec. 1848."

†Whatever it be called it seems impossible to separate the forms found on the different islands from each other or from those on the adjacent mainland.

‡Too near the mainland forms to be considered peculiar to the islands. Zoe i, 27.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
Platystemon Californicus Benth	*	*	*	*	*	Common.
Platystigma Californicum * B. & H			*			Common.
Meconopsis heterophylla Benth			*	*	*	Common.
Dendromecon rigidium† Benth		*	*	*		Common.
Eschscholtzia Californica ‡ Cham	*	*	*	*	*	Common.
Cardamine paucisecta Benth			*			Common.
Cheiranthus asper Ch. & Schl		*				Common.
Arabis filifolia§ Greene			*			
Arabis perfoliata Lam			*			Common.
Arabis arcuata Gray			*			Common.
Thelypodium laciniatum? Endl				*		Mainland.
Erysimum asperum DC			*			Common.
Erysimum insulare Greene	*	*				
Sisymbrium canescens Nutt			*	*		Common.
Sisymbrium officinale Scop			*			Common.
Sisymbrium reflexum Nutt	*	*	*	*	*	Common.
Brassica campestris L	*		*	*		Common.
Brassica nigra Boiss			*	*		Common.
Nasturtium officinale R. Br			*	*		Common.
Capsella Bursa-Pastoris L			*	*		Common.
Capsella divaricata Walp	*	*	*			Southern.
Lepidium lasiocarpum‖ Nutt	*	*		*		Southern.
Lepidium Menziesii DC			*			Southern.
Lepidium nitidum Nutt			*	*	*	Common.
*Thysanocarpus laciniatus*** Nutt			*	*		Common.
Thysanocarpus conchuliferus†† Greene			*			

**P. denticulatum* Greene, Bull. Torr. Club. xiii. 218.

†*D. Harfordii* Kell. *D. flexile* Greene. Zoe i, 46.

‡*E. glauca, maritima, elegans & ramosa* Greene. Whether or not any of these ever receive final recognition as species they have been too nearly matched on the mainland to be classified as peculiar to the islands.

§Compared by Mr. Greene, Pitt. i, 288, to his *A. pectinata* from Lower California, but the latter is apparently much nearer *A. longirostris* Watson, which has been collected by Pringle "in sandy plains near the Gulf of California."

‖By misprint *L. lasiophyllum* in the writer's Santa Rosa list. This and the succeeding species are very doubtfully distinct.

***Thysanocarpus ramosus*, Greene, Bull. Cal. Acad. ii, 390.

††Mr. Greene finds the species, as Torrey & Gray, Flora of North Amer. i, 117, found the genus, quite near *Tauscheria*. It is, however, doubtfully distinct as a species approaching very near forms of *lacinatus* and even of

SPECIES.	San Clemente.	Santa Catalina.	Santa Cruz.	Santa Rosa.	San Miguel.	
Thysanocarpus pusillus Hook			*			Common.
Isomeris arborea Nutt		*		*		Southern.
Viola pedunculata T. & G.		*		*		Common.
Oligomeris subulata Boiss	*		*	*	*	Southern.
Helianthemum scoparium Nutt		*	*	*		Common.
Helianthemum occidentale Greene			*			
Frankenia grandifolia Ch. & Schl	*	*	*	*		Common.
Silene antirrhina L	*		*	*		Common.
*Silene multinervia** Watson *ined*			*	*		Adjacent mainl'd.
Silene Gallica L	*	*	*	*		Common.
Silene laciniata† Cav	*	*	*			Common.
Stellaria media L		*	*	*		Common.
Stellaria nitens Nutt			*			Common.
Arenaria Douglasii T. & G			*	*		Common.
Sagina occidentalis Watson		*	*	*		Common.
Tissa macrotheca Britton	*	*	*	*	*	Common.
Tissa marina L				*		Common.
Polycarpon depressum Nutt				*		Southern.
Pentacæna ramosissima H. & A		*	*			Common.
Calandrinia Breweri Watson			*			Common.
Calandrinia caulescens var. *Menziesii*			*	*		Common.
Calandrinia maritima Nutt			*			Southern.
Claytonia perfoliata Donn		*	*	*	*	Common.
Malva borealis Wallm	*	*	*	*	*	Common.
Malvastrum Thurberi Gray			*	*		Southern,
Malvastrum exile Gray			*			Southern.
Sidalcea malvæflora Gray	*	*	*			Common.
Lavatera assurgentiflora‡ Kell	*	*		*	*	
Geranium Carolinianum L			*	*		Common.
Erodium cicutarium L'Her	*	*	*	*	*	Common.
Erodium moschatum L'Her	*		*		*	Common.
Erodium macrophyllum H. & A			*			Common.

curvipes. The boat-shaped curving of the wing is largely produced by the lack of continuity, and similar effects are found in all the perforated forms though not to so great an extent.

*Proc. Cal. Acad. ser. 2, i, 202; Zoe i, 113. *S. quadrivulnera?* and *S. conoidea* of lists.

†*Silene simulans* Greene, Pitt. i, 63. Proc. Cal. Acad. ser. 2, i, 207. In the species of *Silene* with ample calyx, it is not unusual for the slender clawed petals to group themselves in various positions. Such apparent bilabiates have been observed in *S. Bolanderi, S. laciniata and S. pectinata.*

‡Zoe i, 109. It is claimed that this plant was introduced from Spain by the Franciscan friars early in their occupancy of California.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz.	Santa Rosa.	San Miguel	
Oxalis Wrightii Gray			*			Common.
*Rhamnus crocea** Nutt	*		*	*		Common.
Ceanothus crassifolius	*	*	*	*		Southern.
Ceanothus arboreus† Greene		*	*	*		
Vitis Californica Benth				*		Common.
Acer macrophyllum Pursh			*			Common.
Rhus diversiloba T. & G	*	*	*	*		Common.
Rhus integrifolia (Nutt.)	*	*	*	*	*	Southern.
Rhus laurina Nutt				*		Southern.
Rhus ovata Watson			*	*	*	Southern.
Pickeringia montana Nutt			*			Common.
Lupinus arboreus Sims	*					Common.
Lupinus Chamissonis Esch	*	*	*	*		Common.
Lupinus affinis Agardh			*		*	Common.
Lupinus nanus Dougl			*			Common.
Lupinus micranthus‡ Dougl		*	*	*		Common.
Lupinus truncatus Nutt			*	*		Southern.
Lupinus hirsutissimus Benth			*	*		Southern.
Lupinus concinnus Agh			*	*		Southern.
Lupinus microcarpus Sims			*			Common.
Trifolium Catalinæ§ Watson *ined*				*		Pt. Reyes.
Trifolium ciliatum Nutt			*			Common.
Trifolium gracilentum‖ T. & G			*			Common.
Trifolium Palmeri Watson				*	*	Guadalupe Island
Trifolium tridentatum Lindl	*	*				Common.
Trifolium microcephalum Pursh			*	*	*	Common.
Trifolium microdon H. & A			*			Northern.
Trifolium fucatum Lindl			*			Common.
Trifolium amplectens T. & G			*	*		Common.
Melilotus parviflora Desf	*	*	*	*		Common.
Medicago denticulata Willd	*		*	*	*	Common.
Medicago sativa L	*					Common.
*Hosackia grandiflora*** Benth			*			Adjacent mainl'd.

**R. insularis* of Mr. Greene's list.

†For the present this name is retained, it cannot however be considered more than a variety of one of the mainland species.

‡*L. umbellatus* Greene, Bull. Cal. Acad. ii, 145.

§*T. Macræi* of the writer's Catalina list.

‖*T. exile* Greene is probably a depauperate form of this species. No specimen is to be found in the herbarium of the Academy, but the description agrees well enough with depauperate forms of *T. gracilentum* brought by the writer from Santa Cruz Island.

***Probably *H.? occulta* Greene, Bull. Cal. Acad. ii, 394; as it has been found on the island and agrees well enough with the description of that species of

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
Hosackia maritima Nutt		*	*	*		Southern.
Hosackia strigosa Nutt		*	*	*		Common.
Hosackia parviflora Benth			*			Common.
Hosackia Purshiana Benth			*	*		Common.
Hosackia subpinnata T. & G			*			Common.
Hosackia brachycarpa Benth				*		Common.
Hosackia glabrat Torr	*	*	*	*		Common.
Hosackia micrantha Nutt				*		Southern.
Hosackia argophyllat Gray			*	*	*	Southern.
Astragalus didymocarpus H. & A			*			Common.
Astragalus nigrescens Nutt			*	*		Common.
Astragalus leucopsis T. & G	*	*	*	*		Southern.
Astragalus Antiselli Gray				*		Southern.
Astragalus Miguelensis§ Greene	*	*				Southern.
Astragalus Nevinii Gray					*	
Astragalus trichopodus Gray				*		Adjacent mainl'd.
Vicia Americana Muhl		*	*			Common.
Vicia exigua Nutt	*		*	*	*	Common;
Lathyrus vestitus Nutt			*	*		Southern.
Prunus ilicifolia¶ Walp		*	*	*		Common.

which Mr. Greene described the leaves only. The making of species in difficult genera on such imperfect material can hardly be too strongly deprecated.

†*Syrmatium dendroideum* and *S. patens* Greene; the first a stout erect, the second a lower and more pubescent form of this polymorphous species.

‡*Syrmatium niveum* Greene, Bull. Cal. Acad. ii, 148, is exactly this species. The writer found abundant plants which were mature. *Syrmatium ornithopus* Greene is *S. argophylla* of Palmer's Guadalupe collection. The ovules are both developed instead of one aborting as in the ordinary form. It occurs on Catalina and San Clemente Islands.

§Mr. Greene in Pitt. i, 33, states that it is near his *A. anemophilus* of San Quintin and identifies the latter species with his *Phaca vestita* Benth. Bot. Sulph. but retains the name *anemophilus*, there being an "Old World *Astragalus vestitus*." In Pitt. i, 162, he gives a new name *Astragalus Magdalenæ* to Bentham's *Phaca candidissima* having discovered that there had been one of that name earlier described from Asia. In Pitt. ii, 24, he acknowledges that *A. Miguelensis* is identical with his earlier *A. anemophilus*, and says "Very likely *Phaca candidissima* will prove to be but another synonym of the species." Not wishing to add anything to this confusion the name given to this island plant is retained in the list.

¶Including *P. occidentalis* of Lyon's list, Bot. Gaz. xi, 333; Proc. Cal. Acad. ser. 2, i, 209; Zoe i, 111.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz...	Santa Rosa....	San Miguel...	
Spiræa discolor Pursh		*	*			Northern.
Rubus ursinus Ch. & Schl		*	*	*	*	Northern.
*Cercocarpus parsifolius** Nutt		*	*			Common.
Potentilla anserina L					*	Northern.
Adenostoma fasciculatum H. & A		*	*	*		Common.
Alchemilla arvensis Scop		*	*	*		Common.
Rosa Californica Ch. & Schl		*	*	*	*	Common.
Heteromeles arbutifolia Rœm		*	*	*	*	Common.
Lyonothammus floribundus† Gray		*				
var. *asplenifolius* (Greene)			*	*		
Saxifraga Parryi‡ Torr			*			Southern.
Saxifraga reflexa Hook			*			Northern.
Tellima affinis Gray		*				Common.
Tellima Cymbalaria T. & G			*			Southern.
Heuchera pilosissima§ F. & M			*	*		Northern.
Ribes Menziesii¶ Pursh			*			Common.
Ribes sanguineum Pursh			*			Common.
Ribes viburnifolium Gray		*				Southern,
Tillæa angustifolia Nutt		*				Common.
Tillæa minima Miers		*	*	*		Common.
Cotyledon laxa B. & H			*			Southern.
Cotyledon cæspitosa Haw		*	*			Common.
Cotyledon lanceolata B. & H		*	*	*	*	Southern.
Lythrum Californicum T. & G			*			Common.
Zauschneria Californica‖ Presl		*	*	*	*	Common.
Epilobium coloratum Muhl			*			Common.
Eulobus Californicus Nutt			*	*		Southern.

*C. *betulæfolius* of Mr. Greene's list.

†Zoe i, 111.

‡*Saxifraga malvæfolia* Greene, Bull. Torr. Club. ix, 121; Bull. Cal. Acad. ii, 397. Mr. Greene described this species from a single specimen collected on Santa Rosa Island, afterward several specimens from Santa Cruz Islands were found and included in the type. They are more robust and somewhat more pubescent than the specimens from San Diego—the original locality. None of the specimens from the islands show the ends of the root, so it is impossible to say whether they have the bulbous starch-reservoir of the mainland form or not. There are, however, traces of such expansions at different places in the underground stem. The plant otherwise is the same.

§*H. maxima* Greene, Bull. Cal. Acad. ii, 149 and 397. Proc. Cal. Acad. ser. 2, i, 210.

¶Including *R. subvestitum* of Mr. Greene's list.

‖*Z. villosa* and *cana* Greene, Pitt. i, 27, 28. Proc. Cal. Acad. ser. 2, i, 254.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
Œnothera biennis var. *hirsutissima** Gray		*				Common.
Œnothera cheiranthifolia† Hornem	*	*	*			Common.
Œnothera bistorta Nutt	*	*	*	*		Southern.
Œnothera micrantha Hornem				*		Common.
Œnothera dentata Cav		*				Common.
Godetia purpurea Watson			*			Northern.
Godetia quadrivulnera Spach		*	*	*		Common.
Godetia tenella Watson				*		Common.
Godetia Bottæ T. & G				*		Southern.
Godetia epilobioides Watson			*	*		Common.
Clarkia elegans Dougl		*	*			Common.
Mentzelia gracilenta T. & G					*	Common.
Mentzelia micrantha T. & G		*	*	*		Common.
Echinocystis fabacea‡ Naud	*	*	*	*	*	Common.
Cereus Emoryi Engelm				*	*	Southern.
Opuntia Engelmanni var. *littoralis* Engelm	*	*	*	*		Southern.
Opuntia prolifera Engelm				*	*	Southern.
Mesembryanthemum æquilaterale Haw	*		*			Common.
Mesembryanthemum crystallinum L	*	*	*	*	*	Southern.
Mesembryanthemum nodiflorum Haw				*	*	Southern.
Bowlesia lobata Ruiz & Pavon				*	*	Southern.
Sanicula bipinnatifida Dougl					*	Common.
Sanicula laciniata H. & A			*	*		Common.
Conium maculatum L			*			Common.
Apiastrum angustifolium Nutt	*		*	*		Common.
Berula angustifolia§ Koch	*		*			Common.
Fœniculum officinale Gaertn			*			Common.
Peucedanum caruifolium T. & G		*	*			Northern.
Daucus pusillus Michx	*	*	*	*	*	Common.
Caucalis microcarpa H. & A				*		Common.
Sambucus glauca Nutt		*	*	*		Common.
Symphoricarpos mollis Nutt		*	*	*		Common.

*Œ. *Hookeri* T. & G.

†*E. nitida* Greene, Pitt. i, 70. Proc. Cal. Acad. ser. 2, i, 210. The glabrous form on which this species was founded has since been collected along the railway between Monterey and Castroville.

‡Probably *E. macrocarpa* and *E. Guadalupensis* of the lists from this island. *E. macrocarpa* is supposed to differ from *fabacea* by having 16 instead of 8 seeds; the island plants were 4–8 seeded. The distinction seems not to be a good one. On the mainland in the mountains back of San Diego they are usually 16-seeded but a specimen seen in the Cuyamaca Mountains contained 29. Even *E. Watsonii*, described as 2-seeded, is most commonly 4–8.

§No specimen of this, from the island, in the Academy herbarium.

Species.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
Lonicera hispidula Dougl			*	*		Common.
var. *subspicata* Gray			*	*		Southern.
var. *vacillans* Gray		*		*		Common.
Galium angustifolium Nutt		*	*	*		Southern.
*Galium Californicum** H. & A			*			Common,
Galium Aparine L. var *Vaillanti*		*	*	*	*	Common.
Galium Catalinense† Gray	*		*	*		
Galium Nuttallii‡ Gray	*	*	*	*		Common.
Brickellia Californica Gray			*	*		Common.
Grindelia glutinosa§ Dunal	*	*	*			Common.
Grindelia robusta Nutt			*			Common.
Pentachæta Lyoni Gray				*		Adjacent mainl'd
Aplopappus ericoides H. & A	*					Northern.
Aplopappus squarrosus H. & A			*			Southern.
Bigelovia veneta Gray	*	*	*	*		Southern.
Solidago Californica Nutt		*	*	*		Common.
Corethrogyne filaginifolia Nutt	*	*	*			Southern.
Aster Chamissonis‖ Gray		*				Common.
Aster radulinus Gray			*			Northern.
Erigeron Canadensis L			*			Common.
Erigeron foliosus¶ Nutt	*	*	*	*		Common.
Erigeron glaucus Ker	*	*	*			Common.
Erigeron sanctarum Watson		*				Adjacent mainl'd.
Conyza Coulteri Gray			*			Common.
*Diplostephium canum*** Gray		*	*			Guadalupe Island
Baccharis pilularis†† DC		*	*	*		Northern.

*G. *flaccidum* Greene, Pitt. i, 34. Proc. Cal. Acad. ser. 2, i, 225.

†G. *buxifolium* Greene, Bull. Cal. Acad. ii, 150. Zoe i, 112.

‡G. *Miguelense* Greene, Pitt. i, 34. Proc. Cal. Acad. ser. 2, i, 211.

§G. *latifolia* Kell.

‖*A. foliaceus* of the writer's Santa Rosa list.

¶Including *E. stenophyllus* Nutt. of lists.

**Proc. Am. Acad. xi, 75. *Corethrogyne cana* Greene, Bull. Cal. Acad. i, 223; *Hazardia cana, detonsa* and *serrata* Greene, Pitt i, 29, 30. Proc. Cal. Acad. ser. 2, i, 111. The flowers in all the dried specimens appear purple, but the plant was not in bloom during the visit of the writer to Santa Cruz and Santa Rosa Islands. The differences between the forms described as species are so trivial as not to render them worthy of even varietal rank. Hoffman in Die Naturl. Pflanzenfamilien recognizes the genus, placing it between *Bigelovia* and *Lessingia*, but whatever opinion be adopted as to its generic position there is no ground for more than one species.

††Including *B. consanguinea* of Mr. Greene's Santa Cruz list.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
Baccharis Douglasii DC.		*	*	*		Common.
Baccharis Plummeræ Gray			*			Southern.
Baccharis viminea DC.			*	*		Common.
Pluchea borealis (T. & G.)				*		Southern.
Micropus Californicus F. & M.			*			Common.
Stylocline gnaphalioides Nutt		*	*	*		Common.
Filago Arizonica Gray			*	*		Southern.
Filago Californica Nutt		*	*			Common.
Anaphalis margaritacea L.				*		Common.
Gnaphalium decurrens Ives		*	*		*	Common.
Gnaphalium palustre Nutt				*		Common.
Gnaphalium purpureum L.		*	*			Common.
Gnaphalium ramosissimum Nutt			*			Common.
Gnaphalium Sprengelii H. & A.	*	*	*	*		Common.
Ambrosia psilostachya DC.			*	*		Common.
Franseria bipinnatifida Nutt	*		*	*		Common.
Franseria Chamissonis Less	*					Common.
Xanthium Canadense Mill			*			Common.
Encelia Californica Nutt			*	*		Southern.
Helianthus annuus L.			*			Common.
*Leptosyne gigantea** Kell.	*	*	*	*		Guadalupe Island
Madia dissitiflora T. & G.			*			Common.
Madia sativa Mol.		*		*		Common.
Madia filipes Gray			*	*		Common.
Hemizonia fasciculata T. & G.	*	*	*	*		Southern.
Hemizonia Wrightii† Gray				*		Southern.
Hemizonia paniculata Gray		*				Southern.
Hemizonia Streetsii‡				*	*	San Benito Island
Layia glandulosa H. & A.					*	Common.
Layia platyglossa Gray	*	*	*	*		Common.
Achyrachæna mollis Schauer			*	*		Common.
Jaumea carnosa Gray	*			*		Common.
Venegasia carpesioides DC.		*	*			Southern.
Baeria gracilis Gray		*	*	*		Common.
Baeria Palmeri var. *Clementina*	*	*	*	*	*	Southern.
Eriophyllum Nevinii Gray				*	*	
Eriophyllum stœchadifolium Lag.		*	*			Common.

*According to Dr. Gray, Syn. Fl. i, 2, 300, this species has been found on the mountains near Santa Barbara. The authority for the locality he does not give, and so far as I am aware it has never otherwise been reported from the mainland. It is as he remarks apparently quite distinct from the closely related perennial, *L. maritima*, from San Diego, Del Mar and the Coronados Islands.

†Reported by Dr. Hasse.

‡Reported also from Anacapa by Lorenzo G. Yates.

Species.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
Eriophyllum confertiflorum Gray	*		*	*		Common.
Amblyopappus pusillus H. & A.	*	*	*	*		Southern.
Chaenactis tenuifolia Nutt		*				Southern.
Perityle Emoryi Torr				*	*	Southern.
Achillea Millefolium L.	*	*	*	*	*	Common.
Anthemis cotula L		*		*		Common.
Matricaria discoidea DC			*			Common.
Artemisia Californica Less	*	*	*	*		Common.
Artemisia vulgaris* L.		*	*	*		Common.
Cotula coronopifolia L.				*		Common.
Lepidospartum squamatum Gray			*			Southern.
Senecio Douglasii DC			*			Common.
Senecio Lyonii **Gray**				*	*	Southern.
Senecio vulgaris L.			*			Common.
Cnicus occidentalis† Gray	*	*	*	*		Common.
Silybum Marianum Gaertn			*	*		Common.
Centaurea Melitensis L	*	*	*	*		Common.
Perezia microcephala Gray		*	*	*		Southern.
Microseris Lindleyi¶ DC		*	*	*	*	Common.
Microseris linearifolia§ DC.		*	*	*		Common.
Microseris elegans Greene			*			Adjacent mainl'd.
Stephanomeria cichoriacea Gray			*			Southern.
Stephanomeria exigua Nutt		*				Common.
Stephanomeria paniculata Nutt				*		Northern.
Stephanomeria virgata‖ Benth.	*	*	*			Common.
Rafinesquia Californica Nutt			*	*		Common.
Hypochaeris glabra L.			*			Common.
Malacothrix Clevelandi Gray			*			Common.
Malacothrix Coulteri Gray			*			Common.
Malacothrix incana T. & G.	*	*	*			Common.
Malacothrix foliosa* Gray	*		*		*	Coronados Isl'nds

*The same as *A. Ludoviciana* of previous lists.

†Proc. Nat. Mus. 1888, 531; Zoe, i, 114—San Quintin.

‡*Cnicus lilacinus* Greene Bull. Cal. Acad. ii, 404.

¶*Calais pluriseta* Greene, probably. Proc. Cal. Acad. ser. 2, i, 213. Zoe, i, 126.

§*Microseris anomala* Watson. Zoe l. c.

‖*S. tomentosa* Greene, Bull. Cal. Acad. ii, 152. Answers well enough to the description of *S. virgata* in Syn. Fl. ii, 1, 414, and is well matched by a specimen in Herb. Cal. Acad. from Folsom, Sacramento county, where it grows 3–8 feet high. Dr. Gray considered *S. elata* Nutt. a synonym of *S. virgata*.

**M. *indecora & squalida* Greene. Some of the tall branching forms approach pretty nearly *M. obtusa*, Benth.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
Malacothrix insularis Greene				*		Coronados Isl'nds
Malacothrix saxatilis T. & G.	*	*	*	*		Southern.
Troximon grandiflorum Gray	*	*				Common.
Troximon heterophyllum Greene			*			Common.
Hieracium argutum Nutt		*	*			Adjacent mainl'd.
Sonchus asper Vill		*	*	*		Common.
Sonchus oleraceus L		*	*		*	Common.
Sonchus tenerrimus L				*		Southern.
Specularia biflora Gray			*	*		Common.
Specularia perfoliata ADC			*			Common.
Vaccinium ovatum Pursh			*			Northern.
Arctostaphylos bicolor Gray				*		Southern.
*Arctostaphylos diversifolia** Parry		*	*	*		Southern.
Arctostaphylos pungens† HBK		*	*	*		Adjacent mainl'd.
Arctostaphylos tomentosa Dougl		*	*	*		Common.
Dodecatheon Meadia‡ L		*	*	*		Common.
Anagallis arvensis L				*		Common.
Samolus Valerandi L			*			Southern.
Erythræa Douglasii Gray		*	*			Common.
Erythræa venusta Gray				*		Common.
Gilia atractyloides Steud		*	*	*		Common.
Gilia androsacea Steud		*	*			Common.
Gilia dianthoides Endl			*	*		Southern.
Gilia filifolia Nutt			*			Southern.
Gilia glutinosa Gray				*		Common.
Gilia micrantha Steud	*				*	Common.
Gilia multicaulis Benth			*	*		Common.
Gilia Nevinii§ Gray				*		Common.
Gilia viscidula Gray			*	*		Common.
Nemophila aurita Lindl			*			Common.
Nemophila parviflora Dougl			*	*	*	Southern.
Nemophila racemosa‖ Nutt	*	*	*	*		Common.
Ellisia chrysanthemifolia Benth				*		Southern.
Phacelia grandiflora Gray						

**Comarostaphylos diversifolia* Greene; *Arctostaphylos Stanfordi* of L. G. Yates' list.

†*A. insularis* Greene in Parry, Bull. Cal. Acad. 494. Found on Santa Rosa, on Santa Catalina abundantly, and on the adjacent mainland. The characters relied upon as specific are not found to be constant.

‡Including *D. Hendersonii* and *Jeffreyi* of the lists.

§This species appears to unite with the Chilian *G. laciniata* on one side and with *G. multicaulis* on the other, and forms closely similar to those of the islands are found on the mountains back of Santa Barbara.

‖*Phacelia Douglasii* of L. G. Yates' list.

Species.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
*Phacelia distans** Benth	*	*	*	*	*	Common.
Phacelia hispida Gray			*	*		Common.
Phacelia Lyoni Gray				*		
Phacelia ramosissima Dougl		*	*			Common.
Phacelia viscida† Torr	*	*	*	*		Southern.
Emmenanthe penduliflora Benth			*	*		Common.
Eriodictyon tomentosum Benth				*		Southern.
Heliotropium Curassavicum L	*		*	*		Common.
Amsinckia lycopsoides Lehm	*		*	*		Common.
Amsinckia spectabilis‡ F. & M.				*		Common.
Amsinckia intermedia F. & M.		*	*	*	*	Common.
Krynitzkia ambigua Gray				*	*	Common.
Krynitzkia intermedia Gray				*		Southern.
Krynitzkia Jonesii Gray			*			Southern.
Krynitzkia leiocarpa F. & M	*	*	*			Northern.
Krynitzkia micromeres Gray			*			Common.
Krynitzkia microstachys Greene				*		Common.
Krynitzkia ramosissima Greene				*		Southern.
Plagiobothrys Cooperi Gray			*			Southern.
Plagiobothrys Arizonicus Greene				*		Southern.
Plagiobothrys canescens Benth			*			Common.
Pectocarya penicillata A. DC			*	*		Common.
Convolvulus arvensis L			*			Common.
Convolvulus Californicus Choisy				*		Common.
Convolvulus occidentalis§ Gray	*	*	*	*	*	Adjacent mainl'd.
Convolvulus pentapetaloides L			*			Common.
Convolvulus Soldanella L				*		Common.
Dichondra repens‖ Forst		*		*		Southern.
Cressa Cretica L	*			*		Common.
Cuscuta Californica Choisy				*		Common.
Cuscuta subinclusa Dur. & Hilg			*			Common.

P. scabrella Greene, Pitt. i, 35. Proc. Cal. Acad. ser. 2, i, 214.

P. phyllomanica and *P. floribunda* are omitted from this list, the first being omitted by Gray in Syn. Fl. 2, i, 415, when dealing with the plants of Nevin and Lyon. Both these gentlemen have furnished me with specimens and all the notes in their power, and the conclusion drawn from them is that they do not agree sufficiently well with either of the Guadalupe species. The lobing of the calyx appears to be hardly of specific value.

†According to Mr. Greene, Pitt i, 91. *P. Parryi* of his Santa Cruz list is this species.

‡*A. intermedia* of the writer's Santa Catalina list.

§*C. macrostegius* Greene. Zoe i, 85.

‖*D. argentea* of the Santa Cruz list.

Species.	San Miguel...	Santa Rosa ...	Santa Cruz....	Santa Catalina	San Clemente	
Solanum nigrum L. var.	*	*	*	*		Common.
Solanum Xanti var. *Wallacei* Gray		*	*	*	*	Guadalupe Island
Lycium Californicum Nutt.				*	*	Southern.
*Lycium Richii** Gray				*		Southern.
Datura meteloides DC.			*	*		Southern.
Nicotiana Clevelandi Gray			*	*		Southern.
Linaria Canadensis Dum		*	*	*		Common.
Antirrhinum Nuttallianum Benth	*	*	*	*	*	Southern.
Antirrhinum speciosum† Gray				*	*	Guadalupe Island
Antirrhinum strictum Gray			*	*		Adjacent mainl'd.
Scrophularia Californica Cham.				*		Common.
Collinsia bicolor Benth		*			*	Common.
Pentstemon cordifolius Benth			*	*	*	Adjacent mainl'd.
Mimulus cardinalis Dougl				*	*	Common.
Mimulus brevipes Benth					*	Southern.
Mimulus floribundus Dougl				*	*	Northern.
Mimulus latifolius Gray				*		Guadalupe Island
Mimulus luteus‡ L.			*	*	*	Common.
Mimulus glutinosus§ Wendl			*	*	*	Common.
Castilleia affinis H. & A.	*		*			Common.
Castilleia foliolosa H. & A.					*	Common.
Castilleia hololeuca ‖ Greene	*	*	*			
Castilleia parviflora Bong			*	*	*	Common.
Orthocarpus purpurascens Benth			*		*	Northern.
Orthocarpus densiflorus Benth	*		*			Northern.
Aphyllon tuberosum Gray			*	*	*	Common.
Aphyllon fasciculatum Gray				*		Common.
Monardella lanceolata Gray				*	*	Common.
Micromeria Douglasii Benth					*	Northern.
Sphacele calycina var. *Wallacei* Gray		*	*			Southern.
Salvia Columbariæ Benth		*	*	*	*	Common.
Audibertia nivea Benth				*		Southern.
Audibertia Palmeri Gray				*	*	Southern.
Audibertia polystachya Benth					*	Southern.
Audibertia stachyoides Benth		*	*			Common.

**L. *Hassei* Greene, Pittonia, i, 222. Zoe i, 115.*

†Zoe, i, 112.

‡*M. nasutus* of Mr. Greene's list.

§*Diplacus arachnoideus & parviflorus* Greene.

‖West Am. Scientist, i, 111; Pitt. i, 38. This may possibly hold as a species, but if so only on its pubescence. Its habit is that of *C. foliolosa*—no taller nor whiter than that species. The bracts are either cream-color or red, and the calyx nearly equally cleft before and behind. Proc. Cal. Acad. ser. 2, i, 215, 267; Zoe i, 113.

Species.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel.	
Scutellaria tuberosa Benth			*			Northern.
Marrubium vulgare L.	*					Common.
*Stachys bullata** Benth		*	*			Common.
Verbena prostrata R. Br	*		*	*		Southern.
Plantago major L.			*			Common.
Plantago coronopus† L.				*		Common.
Plantago hirtella HBK.	*					Common.
Plantago Patagonica L.	*	*	*	*	*	Common.
Mirabilis Californica Gray			*	*	*	Southern.
Abronia maritima Nutt	*		*	*		Southern.
Abronia umbellata Lam.	*	*	*		*	Common.
Rumex conglomeratus Murr			*			Common.
Rumex crispus L			*			Common.
Rumex maritimus L.	*		*			Common.
Rumex salicifolius Weinm	*	*	*	*	*	Common.
Polygonum aviculare L.		*	*			Common.
***Eriogonum arborescens*‡ Greene**		*	*			
Eriogonum giganteum‡ Watson				*		
Eriogonum nudum§ Dougl	*	*	*	*	*	Common.
Chorizanthe staticoides Benth		*	*	*		Southern.
Lastarriea Chilensis Remy				*		Common.
Pterostegia drymarioides F. & M.		*	*	*	*	Common.
Amarantus albus L.				*		Common.
Aphanisma blitoides‖ Nutt					*	Southern.
Chenopodium album L.		*	*	*	*	Common.
Chenopodium ambrosioides L.		*	*			Common.
Chenopodium Californicum Watson	*		*	*	*	Common.
Chenopodium murale L.	*		*	*		Common.
Atriplex Breweri Watson				*		Adjacent mainl'd.
Atriplex California Moquin	*	*	*		*	Common.
Atriplex Coulteri Dietr				*		Southern.

****S. acuminata* Greene. As Mr. Greene himself reduces this species to *S. California* Benth. given in the Botany of California as a synonym of *S. bullata*, it is not here necessary to discuss it.**

†*P. maritima* of the writer's Santa Catalina list.

‡These species approach nearer than was at first supposed to mainland forms of *E. fasciculatum* and *E. cinereum* respectively. *E. cinereum* is found along the coast from Santa Monica to San Luis Rey. Very robust forms are found on the sides of cañons at San Pedro.

§*E. Grande* and *E. rubescens* Greene Pitt., i, 38, 39. Proc. Cal. Acad. ser. 2, i, 268.

‖Collected by the writer in a clump of *Lycium Californicum* near the Light-house at San Pedro.

SPECIES.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
Atriplex decumbens Watson.				*		Southern.
Atriplex leucophylla Dietr.	*		*	*	*	Common.
Atriplex microcarpa Dietr			*		*	Southern.
Salicornia ambigua Michx	*	*	*	*		Common.
Suæda Torreyana Watson.	*	*	*	*		Common.
Urtica holosericea Nutt.			*	*		Common.
Urtica urens L.			*	*		Common.
Hesperocnide tenella Torrey					*	Common.
Parietaria debilis Forst		*	*	*	*	Southern.
Ricinus communis L.			*			Southern.
Eremocarpus setigerus Benth.			*	*		Common.
Euphorbia dictyosperma F. & M.				*		Common.
Euphorbia serpyllifolia Pers.				*		Common.
Houttuynia Californica B. & H.				*		Common.
Salix lævigata Bebb.		*	*	*		Common.
Salix lasiolepis Benth			*			Common.
Salix longifolia Muhl.			*			Common.
Populus trichocarpa		*	*	*		Common.
Populus Fremontii var. *Wislizeni*			*			Southern.
Quercus agrifolia Née.		*	*			Common.
Quercus chrysolepis Liebm.			*			Common.
*Quercus Wislizenii** A. DC.			*			Common.
Quercus oblongifolia† Torr		*	*	*		Southern.
Quercus lobata Née.			*			Common.
Quercus dumosa Nutt		*	*	*		Common.
Quercus tomentella Engelm		*	*	*		Guadalupe Island
Pinus Torreyana Parry		*				Southern.
Pinus insignis var. *binata* Engelm		*	*			Guadalupe Island
Habenaria elegans Bol.		*	*			Northern.
Sisyrinchium bellum Wats.	*	*	*			Common.
Allium hyalinum Curran			*			Northern.
Allium lacunosum Watson		*	*			Common.
Allium serratum‡ Watson.				*	*	Common.
Bloomeria aurea Kell.		*	*	*		Southern.

**Q. parvula* Greene, Pitt. i, 40.

†*Quercus Douglasii* of the Catalina list, *Q. Engelmanni*, *Q. MacDonaldi* and var. *elegantula* Greene, West Am. Oaks, Pl. xv, xvii, xxix, xxxiv, running into many forms and not distinguishable from the equally variable forms of the mainland.

‡Stout and tall forms with umbels and flowers as large as *A. unifolium* Kell.; the reticulation, however, exactly that of *A. serratum*. Some of the bulbs closely simulate corms, the outer of the fleshy tunics forming nearly the entire thickness; thus lessening the distance between the sections with cormose and those with tunicated bulbs.

Species.	San Miguel...	Santa Rosa...	Santa Cruz...	Santa Catalina	San Clemente	
*Brodiæa capitata** Benth	*	*	*	*	*	Common.
Brodiæa minor Watson			*	*		Common.
Chlorogalum pomeridianum Kunth				*		Northern.
Lilium Humboldtii R. & L.		*	*			Common.
Calochortus albus Dougl.		*	*			Common.
Calochortus Catalinæ† Watson			*	*		Adjacent mainl'd.
Calochortus Palmeri‡ Watson				*		Southern.
Zygadenus Fremonti Torr		*	*			Common.
Typha Domingensis§ Rorhrb			*			Southern.
Zostera marina L.			*			Common.
Phyllospadix Torreyi Watson		*	*	*		Adjacent mainl'd.
Luzula comosa Meyer		*	*			Common.
Juncus Balticus Deth	*	*	*	*		Common.
Juncus bufonius L.		*	*	*		Common.
Juncus effusus L			*			Common.
Juncus patens Meyer		*				Common.
Juncus robustus Watson				*		Common.
Scirpus pungens Vahl		*				Common.
Scirpus riparius Spreng	*					Common.
Eleocharis palustris R. Br.				*		Common.
Carex angustata Boott			*			Common.
Carex Douglasii Boott		*				Common.
Carex globosa Boott			*			Northern.
Phalaris Canariensis L.	*		*	*	*	Common.
Phalaris intermedia Bosc			*			Common.
Polypogon Monspeliensis Desf.	*	*	*	*		Common.
Agrostis canina L.				*		Northern.
Agrostis exarata Trin				*		Common.
Agrostis Scouleri Trin		*				Northern.
Agrostis verticillata Vill		*				Common.
Muhlenbergia debilis Trin			*			Southern.
Muhlenbergia gracilis Trin				*		Common.

**Brodiæa insularis* Greene. Proc. Cal. Acad. ser. 2, i, 217.

†Whether this species is distinct from *C. splendens* or not, it is found abundantly on the mainland at San Pedro (Dr. Watson writes that he thinks it was collected long ago on the mainland by Wallace), and it can hardly be separated from the forms found on the mountains back of Santa Barbara and on Santa Cruz Island (*S. venustus* of the writer's list).

‡*C. Kennedyi* of Lyon's list — the material for identification having been very poor and scanty.

§*Typha bracteata* Greene, Bull. Cal. Acad. ii, 413. Bull. Torr. Club, xv, 7, where the Rev. Thomas Morong separates *T. Domingensis* from *T. angustifolia* L. and identifies Mr. Greene's species with the former.

SPECIES.	San Miguel...	Santa Rosa...	Santa Cruz....	Santa Catalina	San Clemente	
Stipa eminens Cav			*	*		Common.
Stipa setigera Presl		*	*	*	*	Common.
Stipa Andersoni Vasey		*	*			Monterey.
Aristida bromoides HBK				*		Common.
Avena fatua L	*		*	*		Common.
Trisetum barbatum Steud			*			Common.
Monanthochlæ littoralis Engelm				*		Southern.
Lamarckia aurea Moench				*		Southern.
Kœleria cristata Pers		*	*			Common.
Melica imperfecta Trin			*	*	*	Common.
Distichlis maritima Raf	*	*	*	*		Common.
Poa annua L			*	*		Common.
Poa Howellii V. & S			*			Northern.
*Poa tenuifolia** Nutt			*			Mainland.
Stenochloa Californica Nutt				*		Guadalupe Island
Festuca microstachys Nutt		*	*			Common.
Festuca Myurus L		*	*	*		Common.
Festuca tenella Willd			*	*		Common.
Bromus ciliatus L			*	*		Northern.
Bromus Hookerianus† Thurb		*	*	*	*	Common.
Bromus rubens L				*		Common.
Lepturus paniculatus Nutt				*		Common.
Lolium temulentum L				*		Common.
Agropyrum repens Beauv	*	*	*	*		Common.
Hordeum murinum L		*	*	*		Common.
Hordeum nodosum L					*	Common.
Elymus condensatus Presl	*		*	*		Common.
Equisetum Telmateia Ehrb			*			Common.
Polypodium Californicum Kaulf		*	*	*	*	Common.
Polypodium Scouleri Hook & Grev			*	*		Common.
Gymnogramme triangularis‡ Kaulf		*	*	*	*	Common.
var. *viscosa* Eaton				*		Southern.
Notholæna Newberryi Eaton					*	Southern.
Cheilanthes Californica Mett				*		Common.
Cheilanthes myriophylla§ Desf		*	*			Common.
Pellæa andromedæfolia Fée		*	*	*		Common.
Pellæa ornithopus Hook			*	*		Common.
Pteris aquilina L		*	*			Common.
Adiantum Capillus-Veneris L			*			Southern.
Adiantum emarginatum Hook		*	*	*		Common.

* ?*Poa steriantha* of L. G. Yates' list.

†*Ceratochloa grandiflora* of the San Clemente list.

‡*Notholæna candida* of Mr. Greene's list.

§*C. Californica* of Mr. Greene's list.

SPECIES.	San Clemente	Santa Catalina	Santa Cruz	Santa Rosa	San Miguel	
*Adiantum pedatum** L.			*			Common.
Woodwardia radicans Smith			*			Common.
Asplenium filix-femina† Bernh			*			Common.
Aspidium munitum Kaulf			*			Common.
Aspidium rigidum Swartz			*	*	*	Common.
Aspidium aculeatum‡ Swartz		*				Northern.
Selaginella rupestris Spring		*	*			Common.

*Mr. Greene in Bull. Cal. Acad. ii, 45, makes the curious statement that this, one of our common ferns, abundant even within a few miles of San Francisco is "rare in California."

†No. 321 *Aspidium* — of Mr. Greene's list.

‡No specimens of this plant from the island appear to be extant, and in their absence a certain amount of doubt attaches to the island habitat, more especially on account of the unusual variability of the island forms of *rigidum*.

NOTICES OF SUPPOSED NEW BIRDS.

BY WALTER E. BRYANT.

A comparison of specimens of certain species of birds in my possession, with some others from quite different localities, which have hitherto been supposed to possess the same species, leads me to call attention to these forms, inasmuch as they may be found to be entitled to subspecific recognition.

In 1888, I obtained in Lower California specimens of horned larks which were undeterminable then, but were of such small size and otherwise remarkable that upon returning to the region in 1889 I made a special and successful effort to secure more material, but even with the series of ten specimens obtained was unable to satisfactorily determine the identity of the Magdalena Island (and adjacent region) form of *Otocoris*—the comparative material at hand being wholly insufficient. In preparing the catalogue of Lower Californian birds I reluctantly referred the horned larks to *Otocoris alpestris chrysolæma* (Mexican horned lark). To the credit of Mr. L. Belding, I should say that he did not coincide with this opinion after examining the specimens and even urged the naming

of the new race, which I was loth to do under the circumstances. The bird has since been named by Mr. Chas. H. Townsend, from specimens collected later by himself in Lower California, *Otocoris alpestris pallida*, and received recognition from Mr. Jonathan Dwight, Jr., in his excellent review of the genus *Otocoris*. (Auk, vii, 154.)

Being placed in a similar position in regard to other birds and feeling reasonably sure that some or all will have to be eventually separated, I would here call attention to them with the intention of fully determining their status as soon as sufficient material and literature may be obtained.

In some supplementary notes to Mr. L. Belding's paper, "The Small Thrushes of California," I referred five examples of a dwarf thrush taken in Monterey County to his new species, *Turdus sequoiensis* (Big Tree thrush), although then stating that they were not typical. (Proc. Cal. Acad. Sci., 2d ser., ii, 70.) A re-examination of the specimens leads me to believe that they may belong to an unrecognized race, unless the dwarf hermit thrush (*Turdus aonalaschkæ*), is resident in California and has seasonal changes of plumage not now known. The Monterey County birds in question are most like *Turdus sequoiensis* but decidedly darker above than the type specimens, the markings of the breast are darker and there is more of the tawny tinge on the breast. The wing is shorter, also the middle toe and claw.

In looking over, in company with Mr. W. W. Price, the specimens of the verdin (*Auriparus*), which I collected in Lower California, a marked difference was seen between them and Mr. Price's specimens of *Auriparus* from Texas, the latter being larger and decidedly darker above; moreover the peculiarities of the Texan verdins were remarkably constant in the small series which was examined. The series of the smaller and much paler bird (upwards of a dozen specimens), represented Los Angeles and San Diego counties, Cal.; Tucson, Arizona, and several localities in Lower California. The lightest colored bird being from Los Angeles County and the darker ones from Lower California; those from Arizona seeming to be intermediate or nearer to those from San Diego County.

Dr. Coues has mentioned (Birds of the Colorado Valley, 130), some variations which *Auriparus* assumes and which may be individual, but the limited material which I have had at my disposal points

to two well-defined races which may soon require to be separated, and one of them named without incurring the liability of impeachment for "hair-splitting."

The verdin was first described by Sundevall in 1850 as *Ægithalus flaviceps* from Mexico, and in 1851 Mr. Geo. N. Lawrence described the Texan bird as *Conirostrum ornatum*, which, assuming it to be identical with the Mexican type of Sundevall, would leave the pale western bird eligible to a new name, for which *Auriparus flaviceps ornatus* is appropriate.

DANGEROUS FUNGI.

BY H. W. HARKNESS.

Having already several times called the attention of fruit growers to the prevalence of *Peronospora viticola* and the black-knot *(Plowrightia* [or *Sphæria*] *morbosa)* along the banks of our streams, I intend from time to time to continue the record of the localities where they are observed.

P. viticola has now been observed nearly the whole length of Russian River, not constantly on all the vines, but quite common, and here and there one badly infected. The "black-knot" is very common at middle elevations in the Sierra on the choke cherry, *(Prunus demissa)* and from some specimens which have been sent me apparently on the wild plum *(Prunus subcordata.)* The disease makes knotty, minutely warty swellings of considerable extent, velvety-brown when young, but becoming shining black on the trunk and branches of the affected trees. Yosemite Valley is very badly infested, and specimens have reached me from Tehachapi, and recently from the vicinity of Cahto. It is hardly necessary to recall to the memory of those who have lived in the Eastern States the havoc wrought by this fungus in their cherry and plum orchards.

"Plum pockets" *(Exoascus pruni)* are found frequently on our wild plum. They abound in Yosemite; about the base of Mt. Diablo; and have been brought to me from Sweetwater, El Dorado County; from Volcano, Amador County, and from our neighboring Tamalpais.

All the plums on an infected tree are usually changed to the puffy abortions in which this fungus appears. It so completely holds the plum trees of Tamalpais, that so far as I know no fruit has ever been collected there.

The holly-leaved wild plum *(P. ilicifolia)* seems never to be affected by either of these pests, and a like immunity appears to belong to the small "bitter cherry" of the Sierra Nevada. The Botany of California, by the way, says this *(P. emarginata)* has black fruit. I would be pleased to have notes on the subject.

A NEST OF THE CALIFORNIA BUSH TIT

(Psaltriparus minimus californicus.)

BY CHAS. A. KEELER.

There is no bird on the Pacific Coast that builds a more elaborate nest than the California bush tit. In proportion to the size of the bird it is truly an immense structure, and it is made of such fine materials that the labor of constructing it is very great. A nest which I collected near Berkeley in the spring of 1889 seems worthy of special notice. It was found in an oak *(Quercus agrifolia)* at the height of about fifteen feet from the ground, and shielded from sight by a beautiful streamer of lichen which half covered it. In size it is a little above the average, its external length being about two hundred millimetres. The lower half of the structure is solid, thus making the internal length only about ninety-five millimetres. The nest is composed, as usual, of fine particles of moss, lichens, and very minute twigs, bound together with spider webs, and is lined with soft feathers and willow catkins. In shape it presents no striking peculiarities, it being, as usual, a long, pendulous, slightly gourd-shaped structure, with a hole near the top barely large enough to insert a finger. The novel feature of the structure is an appendage almost large enough to be considered a second nest attached to the main one around the entrance. It forms a large vestibule at the doorway, with a considerable mass of nesting material at its extremity, hanging beside the main nest in an apparently useless flap.

I have examined many nests of this species, but never saw any other with this sort of an attachment. From the care with which it was constructed it is evident that it is not an accidental excresence, but rather a deliberate deviation from, or an improvement on, the typical structure. Mr. L. Belding, who has seen the nest, suggests that it might have been intended as the roosting place of the male, and this seems to be the most natural explanation. The fact that this pocket has a partial lining would seem to confirm this theory.

RECENT LITERATURE.

The Horned Larks of North America. By JONATHAN DWIGHT, JR. Auk, vii, 138–158. Distributed throughout all favorable localities in North America, the horned larks form a large and difficult group of birds, closely and intricately connected with one another, and yet presenting appreciable points of difference. Since Mr. Henshaw's able review of the group, a large amount of new material has become available, thus throwing much additional light upon the subject, and it is very fortunate that the elaboration of this material, consisting of over two thousand of these birds, fell to the lot of Mr. Dwight.

Twenty-two varieties have been made of this one species. It certainly seems unfortunate that the number could not have been considerably reduced, but when we consider the plastic nature of the bird, which causes it to change so readily with its environment, we cannot but think that Mr. Dwight has been as conservative as circumstances would seem to allow. He is certainly prudent in not ascribing specific rank to *giraudi* without material from the intervening districts, although its isolated habitat and distinctive characters would seem to point to its separation.

An extremely interesting fact disclosed by his researches is that there is no spring moult in this species, the breeding plumage being the result of the wearing off of the ends of the feathers. Careful investigation will probably prove that this is true of many others of our passerine birds.

In the distribution of races one circumstance was noted which would seem to indicate that the local varieties are not all so well differentiated as might be expected, viz: the presence of birds breeding at Carson, Nevada, indistinguishable from the *praticola* of New York. Inasmuch as the nature of the country and climate in these two regions is so decidedly different, any explanation of the circumstance seems difficult except that they have not yet become differentiated. Another case somewhat parallel, though much more easily explained, is the occurrence of *strigata* on the Santa Cruz Islands, California, the only point at which they have been taken south of Oregon.

With the exception of *strigata* on these islands, but two forms are ascribed to California, *chrysolæma* and *rubea*. The range of the

former of these two has been extended northward on the coast to latitude 38°, it having previously been considered as restricted to the southern part of the State. *Rubea* has been left as before, as inhabiting the Sacramento and probably the San Joaquin valleys, but *strigata*, with the exception of the above mentioned islands, is not ascribed to northern California even in winter, as it is in Ridgway's Manual.

The article concludes with a table of measurements and a map showing the distribution of the different races. From the table we learn how small is the value of measurements in determining the varieties, there being far more difference in size between the sexes than between many of the varieties. It is to be hoped that through the instrumentality of the American Ornithologists' Union other groups will be worked over in the same satisfactory manner.

C. A. K.

A Review of Some of the North American Ground Squirrels of the Genus Tamias. By J. A. ALLEN. Bull. Am. Mus. of Nat. Hist., vol. iii, pp. 45–116.—In these days of radical and hasty hair-splitting, it is really refreshing to find a naturalist who looks twice before creating new species which will soon help to crowd the list of synonyms. Probably no group of mammals offers so natural and misleading an opportunity for forming new species as does the genus *Tamias;* but Mr. Allen, in his admirable review of this group, has not jumped at his conclusions, but has carefully considered the subject from all its bearings. Owing to the extended range of this genus and the exceedingly close relationship existing between the species, a very large amount of material is necessary in order to draw any conclusions of value; and although Mr. Allen had over six hundred and fifty specimens at his command, he found even this number insufficient.

The extremely important, or, indeed, vital problem of how to distinguish specific or subspecific differences from mere individual variation was presented to him in its most difficult form, and received the careful attention it deserved. An examination of a series of skulls demonstrated the very important fact that it was "impracticable to make much use of cranial characters as a basis for specific distinctions." This discovery is especially valuable, in view of the fact that there has been a tendency of late to base nice specific dis-

tinctions very largely on the size and shape of the skull. A seasonal change in the pelage was discovered to take place, which is another factor tending to complicate the recognition of species and varieties.

Owing to the close relationship existing between the species of the genus *Tamias*, Mr. Allen concludes that they have been modified from some common stock in comparatively recent times. He says: "Probably a more striking example of evolution by environment cannot be cited." Of the twenty-four forms which he recognizes, it is possible that a few will, in the light of more ample material, be reduced from specific to subspecific rank, as, for example, *Tamias amœnus;* but that any of the forms here considered will ever prove to be mere individual variations is highly improbable.

After a general review of the group, which occupies the first twenty-two pages, each species is taken up in detail, in which are given the synonymy, habitat, technical descriptions of the pelage in breeding season, in post-breeding season; and of the young; measurements, a list of the specimens examined, and remarks on the habits and characteristics of each species and on its relationship to allied forms. Thus the whole ground is covered, and all that is now known of our North American chipmunks is here to be found in convenient and systematic shape.

Eight species and varieties are ascribed to California alone. This certainly seems like a very large number for so small an area, and is to be accounted for only by the extreme variation in climate and physical features of the different sections of the State. Some species, which might at first sight appear to be mere varieties, overlap in their range, and may easily be distinguished as distinct even when taken from the same locality, thus proving their specific rank. This is the case with *merriami* and *speciosus*, and also with *frater* and *amœnus*, although in the latter case the differences are not so great, and a larger series from neutral ground might show intergradation.

C. A. K.

The Ibis, ii, No. 7. On the Principal Modern Breeds of the Domestic Fowl, by W. B. Tegetmeier (with 20 illustrations.) On a new Finch from Midway Island, North Pacific, by Scott B. Wilson with colored plate of *Telespiza cantans* gen. et sp. nov.

The Auk, vii, No. 3. Descriptions of a New Species and three New Subspecies of Birds from Arizona, by Dr. Edgar A. Mearns.

Junco ridgwayi, *Spinus tristis pallidus*, *Coccothraustes vespertina montana* Ridgway, and *Melanerpes formicivorus aculeata*. (The latter being the small-billed race which Mr. W. W. Price once collected and sent to an Eastern authority, as representing a new form, but failed to secure a recognition of his views.) Observations on the Avifauna of Portions of Arizona, by Edgar A. Mearns, M. D. (concluded from vol. vii, p. 55.) Notices of 64 species and second description of the nest and eggs of the red-faced Warbler *(Cardellina rubrifrons)*. Notes on Birds Observed in the Colorado Desert in Winter, by F. Stephens. Shows that *Harpochynchus crissalis* ranges as far west as Indio, San Diego county, and winters in the desert, as does also *Pipilo aberti*, *Auriparus flaviceps*, *Polioptila plumbea*, *Oroscoptes montanus* and *myadestes townsendi*, the two latter as stragglers.

First Report of the Secretary of Agriculture, 1889. Contains fourth annual *Report of Ornithologist and Mammalogist*, by C. Hart Merriam, M. D., Chief of Division, etc. Also, articles on the marsh hawk *(Circus hudsonius)* and screech owl *(megascops asio)* with colored plates of both species.

On the Carpologic Structure and Development of the Collemacea and Allied Groups, with eight plates. By WILLIAM C. STURGIS. From Proc. Am. Acad. Arts and Sciences, vol. XXV. The conclusions reached by Dr. Sturgis in this paper cannot be better stated than by quoting his own summary of results as follows: 1. My investigations upon the Collemaceous genera Leptogium and Collema * * * are entirely confirmatory of the results arrived at by Stahl in his investigations upon those groups. There exists in the Collemacea at least two modifications of a sexual type of reproduction, one monoclinic, of which *Collema chalazanum Ach.*, is a typical example, the other diclinic, exemplified by *Leptogium myochroum* (Ehrh., Schaer.) Tuck., and *Collema nigrescens* (Huds.)Ach. 2. The genus Hydrothyria, represented by *H. venosa* Russ., cannot, as heretofore, be considered as typically Collemaceous, but is to be regarded as transitional in its character, and related to the genera Peltigera and Pannaria, between which it forms a more or less definite link. 3. In the groups of typically heteromeric lichens more nearly related structurally to the Collemacea, as well as in the transitional forms represented by Pannaria, Heppia, and Hydrothyria,

there exists, so far as I have seen, no visible evidence of any sexual form of reproduction. The development of the fruit is a purely vegetative process analogous to that seen in many Ascomycetous fungi. 4. In all such lichens, as far as my observation goes, there exists at no stage in the development of the fruit any differentiation of the hyphæ into an ascogenous system and an enveloping system distinct from it. Both asci and paraphyses arise from one and the same system of hyphæ, and with respect to their origin exhibit the closest mutual relationship, thus presenting a marked analogy to those Ascomycetous fungi in which the fruit arises as the result of a purely vegetative process of hyphal growth.

Dr. Sturgis has found that sections made by hand are more satisfactory than with the microtome. With those lichens having a tough cortex the paraffine penetrates very slightly, if at all, while the gelatinous species are likely to be much distorted during the process of embedding. R. S. E.

New fishes collected off the Coast of Alaska and the Adjacen Region southward. By TARLETON H. BEAN. From Proc. U. S. Nat. Mus. Vol. xiii, pp. 37-45. Issued July 1, 1890. The description of seventeen new species and four new genera constitute this contribution.

West American Oaks. By E. L. Greene. Part i, May, 1889; Part ii, June, 1890. 84 pp. 4to, with thirty-seven plates, the first twenty-four by the late Dr. Kellogg, the thirteen following much better ones by George Hanson, but all lacking in the details essential to botanical drawings.

In the first part the author reduces his *Quercus parvula* of Santa Cruz Islands to Q. *Wislizeni;* finds an older name for *Q. Breweri;* makes two new species and one variety (*Q. Engelmanni, Q. MacDonaldi*, and var. *elegantula*) from forms of *Q. oblongifolia** of

*Mr. Greene identifies *Q. Ransomi* Kell. with *Q. Douglassi*, instead of putting it under *Q. lobata* as in the Botany of California. In this he is certainly correct, for not only did Dr. Kellogg so state in the note referred to, but in the annotated list of his species published in Bull. Cal. Acad. which was prepared in constant consultation with him, the statement is reiterated. Mr Greene has however made it sufficiently evident, both by text and drawing, that Dr. Kellogg did not distinguish, if indeed they can always be discriminated, the northern *Q. Douglasii* from the more or less evergreen white oak of the southern part of the State. It is more than probaible, judging from its locality (Tejon Pass south of Tehachapi) that

Bot. Cal.; names two new varieties (*munita* and *polycarpa*) of *Q. dumosa;* describes as new *Q. turbinella* from Lower California; reinstates *Q. Gambellii* Nutt.; maintains *Q. vaccinifolia*† Kell. the alpine form of *Q. chrysolepis* as "at least a fairly good subspecies, its small entire leaves and its young branches being wholly destitute of the fulvous-lepidote pubescence of *Q. chrysolepis;*" and affirms with a good deal of positiveness that *Q. Morehus* Kell. found during the lifetime of Dr. Kellogg on evidence which satisfied him, to be a hybrid (Bull. Cal. Acad. i, 146), "is no hybrid but a clear species most related to *Q. Wislizeni.*"

In the second part the author substitutes *Q. Palmeri* Engelm. for *Q. Dunnii* Kell., because Dr. Engelmann described it first as a subspecies, and according to the author, "It is the rule of botanists who do not recognize subspecies in nomenclature, to treat subspecific names as equivalent to specific."

While there is no doubt that the botanist Palmer, and not the entomologist Dunn, was the discoverer of the shrub, it is equally certain that Dr. Engelmann used "subspecific" as equivalent to "variety" at least in most cases, and in this particular instance testifies (Bot. Cal., ii, 97) to such use of it himself.

Of *Q. tomentella* the author says it has not been found on the islands of Santa Catalina in which statement he is in error, for it is enumerated in Lyon's Catalina list, and the writer found it in abundance. *Q. turbinella* is reduced by implication to a form of *Q. pungens* Liebm. Var. *polycarpa* of *Q. dumosa* is similarly reduced; var. *elegantula* of *MacDonaldi* is considered to be a hybrid of *Q. Engelmanni* and *Q. dumosa;* and it is admitted, let us hope finally, that *Q. Morehus* "must be of the nature of a hybrid."

Q. Ransomi is the earliest synonym of the Californian *Q. oblongifolia*, and therefore antedates *Q. Engelmanni*, one of the types of which, pl. ix, fig. 3, as well as one of the specimens on which var. *elegantula* of *Q. MacDonaldi* was founded, were collected at Tehachapi. The striation of the acorns which Mr. Greene relies upon as diagnostic will not be found constant even in species like *Q. Wislizeni* where it is most pronounced.

†Mr. Greene seems not to be aware that all of Dr. Kellogg's new species of oaks excepting *Q. Ransomi* are represented in the herbarium of the California Academy of Sciences by colored drawings made by himself. *Q. vaccinifolia*, Proc. Cal. Acad. i, 96, is described as "fuscous and stellate-pubescent beneath," and again with "lower surface somewhat tan-colored," and the painting fully agrees with the description.

Nearly all the species reduced by Engelmann to forms of *Q. undulata* are restored, and a new one, *Quercus venustula* Greene, added; *Quercus Jacobi* is raised from the synonymy of *Q. Garryana* to its former rank; and *Quercus Gilberti* pl. xxxvii Greene, from an island in Puget Sound, is established on no better evidence than the sterile shoot of a "low trailing shrub."

Dr. George Engelmann was a most painstaking and careful student of our oaks and other difficult genera, and most of his writings are the results of years of study and research. I resided many years in southern Colorado and at Dr. Engelmann's request collected for him the many forms of the variable oak so abundant there, observed its habits and endeavored to answer his many questions. At the time of his western trip, I had the pleasure of showing him a locality where a multitude of forms were assembled in a small area and as his own words describing it seem so appropriate they are here quoted from Trans. St. Louis Acad. of Sciences, vol. iii, 372, 1876.

"A striking example of the deceptive polymorphism of these western oaks is furnished by the common Rocky Mountain scrub-oak. This interesting species grows on the foot-hills of the eastern slopes of the mountains of Colorado, sparingly near Denver, scarcely north of that city, but abundantly southward, about the Pike's Peak region, and thence extends through New Mexico eastward into Texas, and westward through Utah and Arizona into southern California. Tho center of distribution perhaps, at all events the classical locality of this species, are the mountains above Cañon City, in southern Colorado. In the valley and on the mountain slopes about this place the oak thickets abound, six to eight feet high, single trees occasionally four to six inches thick, rising up to twelve or fifteen feet, rarely higher. The leaves are three to four inches long, broadly obovate, deeply lobed, sometimes pinnatifid, underneath stellate-pubescent; the broad lobes obtuse or retuse, often again two to three lobed. They bear middle-sized or small oval acorns, in more or less knobby hemispherical cups. Scattered copses of these broad-leaved oaks, often of a beautiful brownish-purple in September, accompany us to within a few hundred yards of the cañon, but here the character of these shrubs changes; the bushes are lower, the leaves smaller and in outline narrower, the lobes narrower and mostly undivided, but still obtuse. Now we near the precipice itself; from the ragged dizzy edge we here and there get a glimpse of the young Arkansas, whose clear, green waters toss and foam twelve or fifteen hundred feet under us, through the inaccessible gorge, rushing toward the plains. The oak bushes accompany us even here, but now they are only 4–6 feet high, with leaves two inches long, ovate-lanceolate in outline, no longer lobed, but coarsely dentate, the acute teeth terminating in a sharp point; the acorns are scarcely different from those noticed before. A few steps more, and we have reached the brink of the precipice itself; oak bushes here too, but only three or four feet high, with small (one inch long), oval, firm, almost

cartilaginous, semi-persistent, spiny-toothed leaves, here and there with only very few teeth or quite entire; the acorns proportionately smaller, of the same short oval shape, or often elongated from an unusually small, scarcely knobby and sometimes peduncled cup. We feel satisfied that we might have abundant material to characterize several distinct species, certainly four or five well-marked forms, and indeed, they have been considered such. The first is Nuttall's *Quercus Gambellii* (*Q. stellata* var. *Utahensis*, DC. Prod.); the second is *Q. alba* var. *Gunnisoni* of Torrey; the third, with acutish lobes or coarse teeth, is Torrey's old *Q. undulata* of Long's Expedition, the first oak obtained from these mountains, and described about fifty years ago; the fourth, from the edge of the precipice itself, is what has often been mistaken for Torrey's *Q. Emoryi*, or what has been named *Q. pungens* Liebm., in part; with it occur entire-leaved forms, which seem to unite with this as a fifth form the *Q. grisea* Liebm. * * * In herbarium specimens they all appear distinct enough, but, looking around us, the very abundance of material must shake our confidence in our discrimination: within the compass of a few hundred yards we find not only the forms above distinguished, but numbers of others, which are neither the one nor the other, but which are intermediate between them, and clearly unite them all as forms of one single extremely polymorphous species. If one oak behaves thus, why not others? Thrown into a sea of doubt, what can guide us to a correct knowledge?"

Now Mr. Greene raises these forms again to specific rank, and among them creates a new one. If this polymorphous oak is to be divided into species in this manner, many more equally as good can be made. The persistence of the leaves was carefully observed several years, and it certainly affords no good character for specific distinction of the forms of this oak. Each thicket has its own peculiarities of leaf, acorn, etc., and the different bushes have probably an underground connection. Adjoining thickets or clumps having similar leaves and acorns vary much in the time at which the leaves fall, some lose them with the approach of cold weather, on some they dry and persist for different lengths of time, some drop them gradually through the winter, and on some they persist green till new ones appear in the spring. T. S. B.

Contributions from the U. S. National Herbarium, No. 1, issued June 13, 1890. By GEORGE VASEY and J. N. ROSE. The Botanical Division of the Agricultural Department makes in this publication a commencement towards utilizing the quantity of material accumulating from various sources in the National Herbarium. The plants treated of in this number are recent collections of the veteran naturalist Dr. Edward Palmer, whose notes on the growing appearance and uses of them add greatly to the interest of its pages. The work is a credit to the department, although the proof-reading is very im-

perfectly done, and when dealing with new species this is a matter of considerable importance. In the geography of western botany, the work of the department differs notably from that of the Harvard Herbarium. This is especially apparent in generalizations, as upon the plants of Guadalupe Island, where the list of the twenty-nine species given as peculiar to the island embraces *Trifolium Palmeri*, *Hosackia ornithopus*, *Harpagonella Palmeri*, *Convolvulus occidentalis*, *Convolvulus macrostegius* and *Mimulus latifolius*.

PROCEEDINGS OF SOCIETIES.

CALIFORNIA ACADEMY OF SCIENCES. *July 7, 1890.* President Harkness in the chair.

Mr. F. Gutzkow gave some interesting information regarding a diatomaceous earth from Sonoma County. This mineral, which is found in many places in California, consists chiefly of silica and water, and is of considerable economic importance. It has been used for building; as a polisher under the name of electro-silicon; in glass-making; and as an absorbent for nitro-glycerine in the manufacture of giant powder, etc. That obtained in California, has unfortunately been found unfit for the manufacture of giant powder and the presence of a small quantity of iron prevents its being used for making white glass. Mr. Gutzkow stated that he had devised a cheap and efficient method of eliminating the iron; the method depends on the volatility of ferric chloride.

C. H. Eigenmann exhibited specimens of salmon, salmon trout and trout, explaining that the individuals of a species differ so much according to the condition, the season, the bottom over which they live and the sex, that it is sometimes almost impossible for anyone but an ichthyologist to distinguish between species. This had caused the trouble between the Fish Commissioners and the deputies, about which so much was said a few months ago. A large number of specimens of Lake Tahoe trout were exhibited, Mr Eigenmann having just returned from Donner and Tahoe, bringing all the variations of that species which were to be had at this time. Much diversity of opinion exists among the Tahoe fishermen as to the number of species of trout found in that region, all seeming to think that there are at least two and some placing the number as high as six, namely, the big black trout, the red trout, the porgy (or pogy), the silver trout, the yellow-belly and the brook trout. With the possible exception of the first named, which Mr. Eigenmann did not see, these "varieties" were conclusively shown to represent a single species, *Salmo purpuratus henshawi*.

July 21, 1890. President Harkness in the chair.

Mr. G. P Rixford exhibited specimens of marble from Inyo County, and carbonate of soda from the soda works of Owens Lake, giving a description of the process of manufacture.

Dr. H. Carrington Bolton called attention to the coming meeting of the American Association for the Advancement of Science, and explained the aims and objects of the association.

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